Local Approximation and Quantization of Operators with Bandlimited Kohn-Nirenberg Symbols

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Abstract

In *communiations engineering*, the effect of a slowly time-varying communication channel is commonly modeled as a superposition of different translations and modulations. In order to recover signals from the corresponding channel outputs, one first needs to understand how the channel acts on a signal. A mathematical model often used for the effect of such a channel is an operator with a bandlimited Kohn-Nirenberg symbol. Recent results in operator identification allow for the recovery of such an operator from its output on an identifier signal. However, the reconstruction formulas do not permit the introduction of additional redundancy in the frame used for recovery, as it would be desirable for signal processing applications; for example coarse quantization. In this talk, we show how such redundant representations can be obtained from the output corresponding to suitable identifiers. Coarsely quantizing the resulting representation then yields a good approximation of the operator. In addition, we discuss locality, i.e., to approximate the action of the operator on functions with a given time-frequency localization, only information corresponding to the localization region is needed. This is joint work with Onur Oktay and Götz Pfander.